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Social Sciences and Humanities Research Council of Canada
Conseil de recherches en sciences humaines du Canada
Canada

NUTRITION AND HABIT.

By Mrs. M. Wolryche-Whitmore.

The germ of every living thing, be it animal or plant, has in itself a "formative capacity," enabling it to build up its own form in the likeness of the type to which it belongs. Thus the poppy seed develops into a poppy, making use of the air, the water, and the constituents of the soil as its materials, it builds up stem, leaf and flower of the characteristic colour, form and texture of the type. And its neighbour, the corn-flower, out of similar materials produces an entirely different result, because the original form was different, and its "formative capacity" lay along different lines.

Again, a hen's egg when it hatches invariably produces a chicken, and a turkey's egg produces a turkey, in virtue of the "formative capacity" possessed by the germ in each. This general rule is obvious enough, but it has certain modifications. External circumstances have a very great influence on development. If external circumstances are not equal to turning a poppy into a cornflower, or a hen's egg into a turkey, they are yet able to effect very striking changes. We can all see the effect of cultivation in our garden flowers, and no doubt the prize fowl of to-day is a very different creature to his wild fore-fathers. We need not look far for abundant examples of the effect of external circumstances in modifying development. The race-horse, the fox-hound, differ from other horses and dogs, because their development has been thus modified. The above are all instances of the modifying power of external conditions, on races acting through many generations. The effect on *individual* development is, however, by no means slight. As a general rule the lower the organism, the more remarkable the influence of the external conditions. In higher types, the influence is greatest in early stages of development. The germs of some of the fungi develop into entirely different forms according to the nature of the material upon which they happen to fall. Some of the parasitic creatures change their form entirely according to the nature of the animal whose body they inhabit. Perhaps the most wonderful and interesting of all examples of modifiability is given us by the bees. The work of the Queen bee is to lay eggs; the work of the worker bees, the so-called "neuters," is to make the cells, collect the food, and to feed and take charge of the larvæ. The workers are undeveloped females, and are different both in form and also, as we have seen, in their instincts from the Queen. The royal larvæ are reared in royal nurseries, and fed upon royal food. The worker-larvæ are reared in ordinary cells, and are fed for three days only upon royal food, after which they are fed upon bee-bread. If the supply of royal larvæ fails, the workers choose some of the worker-larvæ, not yet three days old, and which consequently have not yet had any but royal food, they continue to feed these upon the royal food,—a sort of jelly prepared in the bodies of the worker-bees,—and enlarge the ordinary cells to make of them suitable royal cells. The effect of this treatment is to transform the worker-larvæ into perfect Queens. Apparently the bees do not find it impossible to make "a silk purse out of a sow's ear!"

Here then we have the first of the Laws of Nutrition—that every germ has a tendency to develop itself according to the inherited type; but with modifications according to external forces acting upon it.

We have said that in the higher organisms, influences have greater modifying effect in the early stages of development, we have now to see why this is the case.

When we speak of *growth* we may mean either of two things. We may mean a mere increase of size—such as the increase in size of a snowball, or of a rock-crystal. Such growth has no limit inherent to the object. The snowball will continue to grow so long as the boy continues to push it; the rock-crystal will continue to grow so long as material is forthcoming, and no longer; and this growth involves no change beyond mere increase in size—the addition is all from the outside, layer upon layer.

Obviously this is a very different thing to organic growth. Organic growth has limits proper to itself, and (with certain slight individual variations) each organism attains to these limits and does not exceed them. Secondly, organic growth always involves development. Every increase in size involves a complete reconstruction of the whole organism. Compare a baby's hand or foot with your own—the difference

is not merely one of size—if the baby's hand were enlarged it would not be a man's hand, and the same of its whole body. The growing child eats far more in proportion to its size than the man, because of the demand for this constant reconstruction of parts; a far larger amount of material is required for this purpose than for actual growth. The rapidity of this reconstruction is shewn by the way the marks of cuts and scratches disappear from a child's skin so much more quickly and completely than they do later in life, and all kinds of injuries are much more quickly repaired. It is during this growing time that external circumstances have their best chance of making a permanent impression; the machine may be modified to a very great extent while it is in the making. The good pianist, or violinist, the good rider, the good shot, the good cricketer, skater, dancer, &c., have, as a rule, begun young, before their machinery, so to speak, was completed, and fixed in one mould; and thus the machine has been modified to suit the mode in which it is exercised.

In those cases where a tendency to any disease has been inherited, it is while the child is growing that the tendency may be successfully combated. If then, the external conditions are such as to strengthen the weak point, and develop what is lacking, the inherited constitution may often be completely transformed.

When a child has "done growing" the nutritive functions still have their work to perform. The body is subject to waste as a condition of the force it exercises. The food and air are necessary to repair this waste, and health is conditional upon a just balance being kept between waste and nutrition.

The difference between the nutrition of the growing child and of the adult, is comparable to the difference between an unfinished house, requiring materials to complete it, and a finished and occupied house requiring merely to be kept in repair. Again, in the former case, the architect's plan is modifiable, and can be easily altered to suit the purchaser; so in the growing organism, habits can be easily formed. In the latter case, the house is completed, and alterations are difficult and expensive, so with the adult, the habits are formed and are not easily altered.

Of all parts of the body, the nervous system is the one in

which reconstruction and repair goes on most actively; and it is as much subject as other parts of the body to the laws of nutrition. Thus, in the first place, it has a tendency to reproduce the original type; we have a natural tendency to think and act as our parents think and act. Secondly, it is subject to modification by external conditions, that is to say, it is capable of forming habits. Here we come to the consideration of the actions, known as "secondarily automatic actions."

A reflex action is one which is performed involuntarily in obedience to the prompting of a sensation, and without having been at any time acquired by the individual, such as blushing. A secondarily automatic action differs from a reflex action, in having been originally acquired, although it is now performed automatically, such as walking. Speaking generally, reflex actions are more common in the lower animals, and secondarily automatic actions are more common in man.

We saw that many perceptions which are instinctive in animals have to be acquired by man. So here, also, many actions which are reflex in animals are secondarily automatic in man; and, being so, are more under his own control. Both with his perceptions and with his habits, man developes for himself a nervous machinery, and, once developed, the machinery remains permanently.

To go a step further. It is very interesting to trace the effect of the working of the Laws of Nutrition in the ordinary course of thought. If we analyse the thoughts which pass through our minds, we shall find that they follow certain definite rules, known as the Laws of Association. Certain ideas have a natural tendency to produce other ideas. Why does the sight, or even the mental picture, of a dentist's chair, produce a shudder in those who have suffered much at their hands? Because the chair and the pain have so often been present to the consciousness at the same time that the sight, or the mental image of the former, recalls the latter. This mental tendency is known as the law of contiguity, and is obviously an extension into the realm of Psychology, of the law of nutrition, which provides that every organism shall build itself up in accordance with the manner in which it is habitually exercised. When we wish to recall some

train of thought, which we have lost, we go back, in thought, over the circumstances, the conversations, the trains of thought which preceded the lost idea, in the hope that thus, started afresh as it were, the mental machinery will go on of its own accord, and bring back the lost thought to our consciousness. We make an appeal to our automatic mental action.

Many people who have been taught, as children, to repeat the names and dates of the Kings of England, would be quite unable to give you, offhand, the date of Edward III. without going back and beginning with William the Conqueror.

It is by the law of contiguity that a child first begins to speak. A certain sight, having been associated often with a particular sound, the association between the two is established, and the one is sufficient to call up the other.

M. Gouin's system of teaching foreign languages is carefully elaborated in accordance with the law of contiguity. The sound of the foreign word is associated with a vivid mental picture of the object of which it is the symbol; and, further, his series are arranged with respect to the law of contiguity in *time*. In each exercise the sentences follow each other in the true succession of the events they describe, and are thus *naturally* connected, and recall each other.

The law of similarity is the name given to that tendency possessed by any state of consciousness, to call up any other state previously experienced which is similar to it. Thus, a child recognizes any particular horse by its similarity to other animals with which it has learnt to connect that name. The first process, that of recognising the creature, is an illustration of the law of similarity, the second process, that of connecting with it the word horse, is an instance of the working of the law of contiguity.

The power of recognising similarity, implies the power of seeing differences. Some minds have a greater capacity for the one, and some for the other, and this difference is recognisable in quite little children. This power of the mind is the foundation of all classification. In all sciences of classification the *similarities* of the objects are sought for in all the minor divisions, that the definitions of the gerera may be made to include all objects having certain

points in common; in the larger divisions into Families and Orders the *differences* are more noted.

The Sciences of Induction are also dependent on this same mental power, though here the similarities and differences are not those of objects, but of causes.

Deductive reasoning may be described as the same process, performed backwards; the laws are then applied to instances and the classification applied to new objects. In education both sides of this faculty are to be cultivated. The child should not be exercised exclusively in deductive reasoning, as, for instance, in the old methods of teaching grammar and modern languages, where the rule was given, and the child had merely to apply it to each instance as it arose. The inductive method should rather precede the other; the child should work back from the examples to the rules, as the human race has done.

We see, therefore, that our ordinary actions, often repeated, shape our physical organs; and our ordinary impressions, often repeated, form definite sequences of thought according to fixed rules. Further, that this formation of muscles, nerves, and mental organs, determines for us the course of our thoughts and actions, when these latter are not controlled by an effort of will. In animals and young children the will does not interfere, to any great extent, in the carrying out of the course of action and thought, and therefore it is in children and animals that we see the full force of habit. They are, as a rule, slaves to routine, and are quite unhappy if there is the least deviation from the usual programme.

Dr. Carpenter points out two agencies which work powerfully in shaping the habits of the child. One is the atmosphere of the home, the other the force of custom and public opinion; the former is the family influence on character, the latter is the social influence. Over the latter influence parents have, during childhood even, only an indirect influence, by choice of companions, school, &c.; but over the former they are absolute.

Indeed, we may almost say that the parents *are* the "atmosphere" of the home. As Mr. Lyttelton reminds us in "Mothers and Sons," that which is put on for the children's benefit is useless; what we really are, in ourselves, is what affects them.